



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/893,315	06/26/2001	Timothy J. Reardon	291958161US	2812
25096	7590	11/23/2004	EXAMINER	
PERKINS COIE LLP			KOCH, GEORGE R	
PATENT-SEA			ART UNIT	
P.O. BOX 1247			PAPER NUMBER	
SEATTLE, WA 98111-1247			1734	

DATE MAILED: 11/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/893,315

Applicant(s)

REARDON ET AL.

Examiner

George R. Koch III

Art Unit

1734

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 54-196 is/are pending in the application.
- 4a) Of the above claim(s) 191-195 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 54-190 and 196 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/27/02 & 1/15/02
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 54-190 in the reply filed on 9/10/2004 is acknowledged. Newly submitted claim 196 has also been grouped with claims 54-190. Method claims 191-195 is not rejoined with newly proposed claim 196, since newly proposed claim 196 can be used to practice another and material different process, such as coating wood panels.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 60-64, 89-93, 136-137, 156-157, and 165-169 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This application is a continuation of 09/575,965, which is a continuation of 08/883,393, which is a division of 08/422,485, which is a CIP of 07/855,767, which is a CIP of 07/665,942, which is a CIP of 07/526,243. None of these parent applications, nor the current specification, appear to supply support for the recirculating system and its related components.

4. Claims 67, 68, 88, 89, 121, 122, 129, 130, 174, and 175 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. is application is a continuation of 09/575,965, which is a continuation of 08/883,393, which is a division of 08/422,485, which is a CIP of 07/855,767, which is a CIP of 07/665,942, which is a CIP of 07/526,243. None of these parent applications, nor the current specification, appear to supply support for the "250" rpm limitation.

5. Claims 84, 114, 149 and 190 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. is application is a continuation of 09/575,965, which is a continuation of 08/883,393, which is a division of 08/422,485, which is a CIP of 07/855,767, which is a CIP of 07/665,942, which is a CIP of 07/526,243. None of these parent applications, nor the current specification, appear to supply support for the "heat dissipater" element.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1734

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 54-70, 75-99, 104-122, 150-175 and 180-190 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ringer (US Patent 4,590,094) in view of Nagatomo (US Patent 4,282,825).

Note: independent claims 54, 85, 115, 150, and 161 are addressed first, followed by the dependent claims.

As to claim 54, Ringer discloses an apparatus for processing a single wafer, such as a semiconductor wafer, a magnetic disk, or an optical disk, comprising: a processing bowl (item 12), the processing bowl comprising an inner portion having an interior adapted to receive a pool of a processing chemical, an outer portion, and a fluid-receiving space between the inner portion and the outer portion; a chemical supply (items 19 and 20) adapted to supply the processing chemical to the processing bowl; a processor head (item 10) mounted for movement between at least one loading position and at least one processing position, the processor head in its loading position being

Art Unit: 1734

adapted to position a wafer outside the interior of the inner portion (see Figure 3), the processor head carrying a rotatable wafer support adapted to support a wafer within the interior of the inner portion when the processor head is in the processing position.

Ringer does not disclose a frame work, that the processing bowl is mounted to the frame work, or a wafer transfer adapted to move wafers to and from the processing bowl, and to and from the second processing chamber.

Nagatomo discloses a framework (see Figures, especially Figures 1 and 2, which shows numerous unmarked frame structures), that the processing bowl (etch stations 1a, 1b, and 1c) is attached to the framework, multiple second processing chamber (items 2 and 3a, 3b, 3c) and a wafer transfer adapted to move wafers to and from the second processing chamber. One in the art would immediately recognize that the framework provides support and structure to the apparatus, that the wafer transfers enable continuous treatment (see column 2, lines 44-48), and that the additional chambers provide subsequent processes to the substrate (see columns 3 and 4) to improve the substrate condition. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized such frameworks, additional processing chambers, and wafer transfer mechanism as in Nagatomo in order to provide structure to the apparatus, enable continuous treatment, and provide subsequent processes to the substrate.

As to independent claim 85, see the rejection of claim 54 above. The processor head is also in its loading position adapted to position wafers above the processing bowl.

As to independent claim 115, see the rejection of claim 54 above. The processor head of Ringer is capable of having at least one loading position and one processing position as claimed (and see Ringer, Figure 3), the processor head in its loading position being adapted to position a wafer higher than the upper edge of the processing bowl for loading or unloading a wafer from the processor head, the processor head carrying a rotatable wafer support and a motor, the wafer support (item 10) being adapted to support a wafer below the upper edge of the processing bowl when the processor head is in its processing position, the motor (item 15) being positioned above the wafer support and adapted to rotate the wafer support and any wafer held therein.

As to claim 150, see the rejection of claim 54 and 115 (for processor head details) above. Ringer further discloses a drain (item 12b).

As to claim 161, see the rejection of claims 54 and 115 above.

As to claim 55, 117, 153 Ringer discloses the wafer support extends downwardly to a height below an upper edge of the processing bowl when the processor head is in the processing position (see Figure 1)

As to claim 56, 154 Ringer discloses that the wafer support is positioned to support wafers at a height below an upper edge of the processing bowl (figure 1).

As to claim 57, 86, 162, Ringer further discloses a drain (item 12b).

As to claim 58, 87, 155, 163, Ringer further discloses a fluid line as claimed (item 18).

As to claim 59, 88, 125, 164, the fluid of Ringer from the fluid line is directed towards the drain (Figure 1).

As to claim 65, 94, 118, 158, 170, the processing head of Ringer is adapted to move vertically downwardly towards the location of the pool (item 17).

As to claim 66, 95, 119, 159, 171, the processing head of Ringer is adapted to move vertically upwardly away from the location of the pool (item 17).

As to claim 67, 96, and 172, Ringer discloses a motor as claimed (item 15).

As to claim 68, 97, 120, and 173, applicant is claiming an apparatus, and the motor of Ringer is capable of performing the spinning processes as claimed.

As to claim 69, 98, 121, and 174, applicant is claiming an apparatus, and the motor of Ringer is capable of performing the spinning processes as claimed.

As to claim 70, 99, 122, and 175, applicant is claiming an apparatus, and the motor of Ringer is capable of performing the spinning processes as claimed.

As to claim 116, the bowl of Ringer is capable of receiving a pool of processing chemicals.

As to claim 124, Ringer discloses both an inner and outer portion (item 17 and 12), with the inner portion capable of holding a pool as claimed.

With regard to claims 75-78, 104-107, 151-152, and 180-183, official notice is taken that the use of acid resistant components and structures adapted for acid use is

notoriously well known and conventional, especially in semiconductor wafer processing operations, which often use acid based materials for the processes (hydrofluoric acid, for one). One in the art would immediately recognize that acid resistant materials would improve the durability of the components. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize well known and conventional acid resistant materials in order to improve component durability. Furthermore, as to claims 78, 107, and 183, Ringer discloses a drain line (item 12b).

With regard to claims 60-64, 89-93, 156-157 and 165-169, official notice is taken that the use of recirculation systems, heater controls, heat exchangers and the like is notoriously well known and conventional, especially in semiconductor wafer processing operations. One in the art would appreciate that semiconductor processing materials and solutions are extremely expensive and require specific operating conditions, and the a recirculation system with temperature controls would prevent the waste of the materials and ensure their usability in future processes. Therefore, it would have been well known and conventional to one of ordinary skill I the art at the time of the invention to have utilized such recirculation system in order to reduce the cost of semiconductor processing.

With regard to claims 79-84, 108-114, 160, and 184-190, official notice is taken that the use of such routine structures such a heat source, platforms that can be raised, wafer support stands, and heat dissipaters is notoriously well known and conventional in

wet processing semiconductor operations. One in the art would immediately appreciate that these structures speed up the drying time for wafer, improving throughput.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized such well known and conventional structures in order to improve processing throughput.

9. Claims 71-74, 100-103, 123, 126-149, 176-179 and 196 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ringer (US Patent 4,590,094) in view of Nagatomo (US Patent 4,282,825) and *either* of Karl (US Patent 4,651,440) or Thompson (US 5,156,174).

As to claim 126, see the rejections of claims 54 and 115 under Ringer and Nagatomo above. Ringer and Nagatomo do not disclose the annular recess.

However, Thompson discloses annular recesses as claimed (item 78, called an annular trough). Thompson discloses that these recesses serve to collect excess spray liquid (see column 7, lines 1-6). One in the art would appreciate that such recesses prevent damage to the substrate. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize such a recess in order to reduce damage to the substrate.

As to claim 127, Ringer discloses a motor as claimed (item 15).

As to claims 128-130, applicant is claiming an apparatus, and the motor of Ringer is capable of performing the spinning processes as claimed.

As to claims 131 and 132, the wafer support of Ringer extends as claimed (see Figure 3).

As to claim 133, Ringer discloses a fluid line and drain line as claimed (items 18 and 12b).

As to claim 134, Ringer discloses both an inner and outer portion (item 17 and 12), with the inner portion capable of holding a pool as claimed.

As to claim 135, Ringer discloses a drain in the location claimed (item 12b) such that it can function as claimed.

As to claim 138 and 139, Ringer discloses that the processor head can move as claimed.

As to claim 196, see the rejections of claims 54 and 115 under Ringer and Nagatomo above, which disclose the processor head, the processing bowl, the means for positioning a processor head, the means for lowering the processor head, the means for supplying processing chemicals, the means for lifting the processor head, means for engaging the wafer transfer, and means for transferring the wafer.

Ringer and Nagatomo do not disclose peripherally supporting the wafer.

However, both Karl and Thompson discloses that the processor head extends outwardly of the periphery of the wafer (see Karl, Figure 1, item 125 and Thompson, Figure 4, items 40). Karl discloses that the expand processor head improves support of the wafer/substrate by avoiding the flaws of a vacuum grip (see column 1), while Thompson discloses that the expanded processor head is better suited for handling

larger substrates (see column 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized such expanded process heads that extend outwardly of the wafer periphery in order to avoid the flaws of the vacuum grip and achieve better handling of larger wafers.

As to claims 71, 100, 123 and 176, Ringer and Nagatomo do not disclose annular gas recesses. However, Thompson discloses annular recesses as claimed (item 78, called an annular trough). Thompson discloses that these recesses serve to collect excess spray liquid (see column 7, lines 1-6). One in the art would appreciate that such recesses prevent damage to the substrate. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize such a recess in order to reduce damage to the substrate.

As to claims 72, 101, and 177, neither Ringer nor Nagatomo discloses the downwardly and upwardly directed faces.

However, both Karl and Thompson (items 125 and 40, respectively) disclose wafer supports with a wafer support plate, and that the wafer support plate further has a downwardly directed front face and an upwardly directed back face. One in the art would appreciate that the faces "grip" the substrate and prevent the wafer from dislodging during spinning, thus improving coating. Karl discloses that the expanded processor head improves support of the wafer/substrate by avoiding the flaws of a vacuum grip (see column 1), while Thompson discloses that the expanded processor

head is better suited for handling larger substrates (see column 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized such faces in order to avoid the flaws of the vacuum grip and provide better handling of larger substrates.

As to claim 73, 102, and 178, the faces of Karl and Thompson function as a plurality of fingers.

As to claim 74, 103, and 179, the fingers of Karl and Thompson peripherally support the wafer.

With regard to claims 140-143 official notice is taken that the use of acid resistant components and structures adapted for acid use is notoriously well known and conventional, especially in semiconductor wafer processing operations, which often use acid based materials for the processes (hydrofluoric acid, for one). One in the art would immediately recognize that acid resistant materials would improve the durability of the components. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize well known and conventional acid resistant materials in order to improve component durability. Furthermore, as to claim 143, Ringer discloses a drain line (item 12b).

With regard to claims 136-137, official notice is taken that the use of recirculation systems, heater controls, heat exchangers and the like is notoriously well known and conventional, especially in semiconductor wafer processing operations. One in the art

would appreciate that semiconductor processing materials and solutions are extremely expensive and require specific operating conditions, and the a recirculation system with temperature controls would prevent the waste of the materials and ensure their usability in future processes. Therefore, it would have been well known and conventional to one of ordinary skill in the art at the time of the invention to have utilized such recirculation system in order to reduce the cost of semiconductor processing.

With regard to claims 144-149, official notice is taken that the use of such routine structures such a heat source, platforms that can be raised, wafer support stands, and heat dissipaters is notoriously well known and conventional in wet processing semiconductor operations. One in the art would immediately appreciate that these structures speed up the drying time for wafer, improving throughput. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized such well known and conventional structures in order to improve processing throughput.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double

Art Unit: 1734

patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 54-190 and 196 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-50 of U.S. Patent No. 6,375,741 in view of Ringer, Nagatomo, Karl and Thompson. The claims of US 6,375,741 claim substantially all of the critical limitations of the patent, such as the processing head, the wafer grippers. Ringer, Nagatomo, Karl and Thompson disclose all of the limitations of the claims (see 103 rejections above for citations). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the claims of US 6,375,741 with the cited references in order to achieve further functionality of the apparatus.

12. Claims 54-190 and 196 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-23 of U.S. Patent No. 5,658,387 in view of Ringer, Nagatomo, Karl and Thompson. The claims of US 5,658,387 claim substantially all of the critical limitations of the patent, such as the processing head, the wafer grippers. Ringer, Nagatomo, Karl and Thompson disclose all of the limitations of the claims (see 103 rejections above for citations). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the claims of US 5,658,387 with the cited references in order to achieve further functionality of the apparatus.

Art Unit: 1734

13. Claims 54-190 and 196 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-44 of U.S. Patent No. 5,431,421 in view of Ringer, Nagatomo, Karl and Thompson. The claims of US 5,431,421 claim substantially all of the critical limitations of the patent, such as the processing head, the wafer grippers. Ringer, Nagatomo, Karl and Thompson disclose all of the limitations of the claims (see 103 rejections above for citations). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the claims of US 5,431,421 with the cited references in order to achieve further functionality of the apparatus.

14. Claims 54-190 and 196 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-44 of U.S. Patent No. 5,235,995 in view of Ringer, Nagatomo, Karl and Thompson. The claims of US 5,235,995 claim substantially all of the critical limitations of the patent, such as the processing head, the wafer grippers. Ringer, Nagatomo, Karl and Thompson disclose all of the limitations of the claims (see 103 rejections above for citations). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the claims of US 5,235,995 with the cited references in order to achieve further functionality of the apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George R. Koch III whose telephone number is (571) 272-1230 (TDD only). If the applicant cannot make a direct TDD-to-TDD call, the

applicant can communicate by calling the Federal Relay Service at 1-866-377-8642 and giving the operator the above TDD number. The examiner can normally be reached on M-Th 10-7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Fiorilla can be reached on (571) 272-1187. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



George R. Koch III
Patent Examiner
Art Unit 1734

GRK
11/14/2004